REMARKS

On March 9, 2004 and April 6, 2004, Attorney for the Applicant and the Examiner conducted teleconferences. The scope of the claim rejections and the cited references were discussed. Specifically, Attorney for the Applicant and Examiner discussed the scope of the pending claims in light of the Mochizuki, Okunuki, Angelsen and Cerofolini references. In addition, the Examiner noted an additional reference, namely Cerofolini (U.S. Patent No. 6,572,548). The Cerofolini ('548) reference is submitted in an Information Disclosure Statement filed April 23, 2004.

The present application includes claims 1, 3-21 and 23-32. Claims 1, 3-21 and 23-32 were rejected. Claims 1, 3, 13, 16, 21 and 23 are amended in response to the Examiner's rejections.

Claims 1 and 16 are amended to recite the limitation of a rotational control device activating the stepper motor to rotate the transducer array a predetermined angle for each activation of the device, where the predetermined angle is greater than an incremental step angle of the stepper motor.

Claim 3 is amended to recite the limitation a rotational control device including a switch, where the device activates the stepper motor to pivot the transducer array a predetermined angle when the switch is activated and the predetermined angle is greater than an incremental step angle of the stepper motor.

Claim 13 is amended to recite the limitation of a rotational control device including a button, where the device activating the motor to pivot the transducer array a predetermined angle when the button is activated and the predetermined angle is greater than an incremental step angle of the motor. Claim 13 is also amended to change "said drive shaft" to "a drive shaft" in order to correct antecedent basis.

Claim 21 is amended to recite the limitation of pivoting the transducer array a predetermined angle around the rotation axis with respect to the central scan plane by rotating a belt connected to said drive shaft and providing a rotational control device activating the stepper motor to pivot the transducer array the predetermined angle for each activation of the device, where the predetermined angle is greater than an incremental step angle of the stepper motor. Claim 21 is also amended to change "said drive shaft" to "a drive shaft" in order to correct antecedent basis.

Claim 23 is amended to recite the limitation of providing a rotational control device including a switch, where the device activates the stepper motor to pivot the transducer array a predetermined angle when the switch is activated and the predetermined angle is greater than an incremental step angle of the sepper motor.

Claims 1, 3, 5, 6, 9, 13, 15-17, 21, 23, 25, 26 and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki et al. (U.S. Patent No. 5,152,294) in view of Okunuki et al. (U.S. Patent No. 5,460,179).

Claims 4 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Cerofolini (U.S. Patent No. 5,740,804).

Claims 7-8, 19-20 and 27-28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki and Okunuki in view of Angelsen (U.S. Patent No. 4,757,818).

Claims 10-12, 14 and 30-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki and Okunuki in view of Cerofolini.

The Applicant first turns to the rejection of claims 1, 3, 5, 6, 9, 13, 15-17, 21, 23, 25, 26 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki et al. in view of Okunuki et al. Mochizuki relates to a three-dimensional ultrasonic scanner. Mochizuki describes an operation switch 58 provided on a grip portion 25 of the transducer unit (col. 6, lines 41-48; FIG. 3). The "operation switch 58 serves to start and stop the data acquisition action . . ." (col. 6, lines 43-44). The operation switch 58 may also momentarily stop the swing movement of the transducer unit (col. 6, lines 46-49). In this way, the operation switch 58 of Mochizuki is limited to either starting the acquisition of data or stopping the swing movement of the transducer unit.

Conversely, Mochizuki does not teach or suggest a rotational control device activating a motor or stepper motor to rotate or pivot the transducer array a predetermined angle for each activation of the device or when the device is activated, where the predetermined angle is greater than an incremental step angle of the motor or stepper

motor, as recited in claims 1, 3, 13, 16, 21 and 23. Instead, as described above Mochizuki merely describes an operation switch 58 only serving to either start and stop **data acquisition action** or to momentarily **stop** the swing movement of the transducer unit (col. 6, lines 41-48). In this way, the operation switch of Mochizuki may serve to start or stop data acquisition while the transducer unit is still moving. Similarly, the operation switch of Mochizuki may serve to momentarily stop the swing movement of the transducer unit, but it may not serve to activate a stepper motor. As such, the operation switch of Mochizuki does not serve to cause the transducer array to rotate or pivot any predetermined angle at all.

Thus, the Applicant respectfully submits that Mochizuki does not teach or suggest elements of claims 1, 3, 13, 16, 21 and 23.

Okunuki relates to an ultrasonic transducer assembly and method of scanning. Specifically, Okunuki describes a transducer unit that rotates about a virtual rotative axis (col. 6, lines 13-26; FIG. 3, reference character 32). However, Okunuki does not remedy the shortcomings of Mochizuki as described above. Okunuki merely describes "a switch 64 . . . mounted on the upper casing 22. Th[e] switch 64 is used as an operation switch for starting the acquisition of echo data" (col. 8, lines 43-45; FIG. 3). As such, the operation switch 64 of Okunuki is limited to starting data acquisition, similar to the operation switch of Mochizuki, as described above.

Therefore, the operation switch 64 of Okunuki does not teach or suggest any rotational control device activating a motor or a stepper motor to rotate or pivot a

transducer array a predetermined angle for each activation of the device or when the device is activated, where the predetermined angle is greater than an incremental step angle of a stepper motor, as recited in claims 1, 3, 13, 16, 21 and 23. Conversely, the operation switch of Okunuki (similar to the operation switch of Mochizuki) is limited to starting data acquisition, and has absolutely nothing to do with the activation of any motor (col. 8, lines 43-45; FIG. 3).

Thus, the Applicant respectfully submits that Okunuki does not teach or suggest elements of claims 1, 3, 13, 16, 21 and 23.

Moreover, assuming for the sake of argument that one would combine Mochizuki and Okunuki, the combination would not teach or suggest elements of the present claims. As set forth above, the operation switches of Mochizuki and Okunuki are not related to the activation of any motor, much less the activation of a motor or a stepper motor. Therefore, the Applicant respectfully submits that a combination of Mochizuki and Okunuki does not teach or suggest elements of the present claims.

The present rejection encompasses claims 1, 3, 5, 6, 9, 13, 15-17, 21, 23, 25, 26 and 29. The Applicant respectfully submits that neither Mochizuki nor Okunuki, alone or in combination, teach or suggest elements of independent claims 1, 3, 13, 16, 21 and 23. Claims 5, 6, 9, 15, 17, 25, 26 and 29 depend from claims 1, 3, 13, 16, 21 and 23. Therefore, the Applicant respectfully submits that claims 1, 3, 5, 6, 9, 13, 15-17, 21, 23, 25, 26 and 29 should be allowable.

The Applicant next turns to the rejection of claims 4 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Cerofolini. Cerofolini relates to a multipanoramic ultrasonic probe. Cerofolini describes a transducer array rotated about each of two perpendicular axes by a pair of motors and motor shafts (col. 6, lines 22-40; col. 6, lines 64-70 and col. 7, lines 1-16). Each motor rotates the transducer array by a series of gears (col. 6, lines 22-40, 64-68; col. 7, line 1).

Cerofolini does not teach a handcrank employed to pivot a transducer array, as recited in claims 4 and 24. More generally, **Cerofolini does not teach or suggest the use whatsoever of any sort or type of handcrank employed to pivot a transducer array**. Conversely, Cerofolini describes the use of an electrical signal, two motors and a series of gears to rotate a transducer array (col. 6, lines 22-68; col. 7, lines 1, 17-27) in each of two perpendicular axes (col. 6, lines 22-40; col. 6, lines 64-70 and col. 7, lines 1-16). Thus, the Applicant respectfully submits that Cerofolini does not teach or suggest elements of the present claims.

Mochizuki does not remedy the shortcomings of Cerofolini. Mochizuki does not teach a control member comprising a handcrank employed to pivot a transducer unit. Instead, Mochizuki merely describes a transducer unit that acts as a swing mechanism and is powered by a motor, a gear section, a support shaft and suspension arms (col. 4, lines 5-12; FIG. 2). That is, **Mochizuki does not teach or suggest the use whatsoever of any sort or type of handcrank employed to pivot a transducer array**. Thus, the

Applicant respectfully submits that Mochizuki does not teach or suggest elements of the present claims.

Moreover, assuming for the sake of argument that one would be motivated to combine Mochizuki and Cerofolini, the combination does not teach or suggest elements of the present claims. As described above, neither Mochizuki nor Cerofolini teach or suggest any sort or type of handcrank at all, much less a handcrank employed to pivot a transducer array. As such, a combination of Mochizuki and Cerofolini would also fail to teach or suggest a handcrank employed to pivot a transducer array, as recited in claims 4 and 24. Therefore, the Applicant respectfully submits that a combination of Mochizuki and Cerofolini does not teach or suggest elements of the present claims.

The present rejection encompasses claims 4 and 24. The Applicant respectfully submits that neither Mochizuki nor Cerofolini, alone or in combination, teach or suggest elements of claims 4 and 24. Therefore, the Applicant respectfully submits that claims 4 and 24 should be allowable.

The Applicant next turns to the rejection of claims 7-8, 19-20 and 27-28 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki and Okunuki in view of Angelsen. Angelsen describes an ultrasonic transducer probe with linear motion drive mechanism. The transducer unit of Angelsen is connected to a pulley wheel (col. 4, lines 45-48; FIG. 2). The pulley wheel is connected to a flexible pulling mechanism, which is in turn connected to a coil assembly (col. 4, lines 3-5). The coil assembly moves linearly by a

cylindrical magnet and magnetic field iron circuit creating a strong magnetic field across an air gap (col. 3, lines 64-68). As the flexible pulling element is attached to the coil assembly, the pulling element is also pulled along the linear motion of the assembly (col. 4, lines 40-45). This linear motion of the pulling element is transferred into rotary motion of the transducer unit by two pulley wheels (col. 4, lines 40-48).

However, Angelsen does not remedy the shortcomings of either Mochizuki or Okunuki or a combination of Mochizuki and Okunuki, as set forth above. Specifically, like Mochizuki and Okunuki, Angelsen does not teach or suggest any sort or type of rotational control device activating a motor or stepper motor to rotate or pivot the transducer array a predetermined angle for each activation of the device or when the device is activated, where the predetermined angle is greater than an incremental step angle of the motor or stepper motor, as recited in claims 1, 3, and 21. Specifically, Angelsen does not disclose any type or sort of rotational control device that acts to cause any movement whatsoever of a transducer array. Thus, the Applicant respectfully submits that Angelsen does not teach or suggest elements of claims 1, 13 and 21.

Moreover, a combination of Mochizuki, Okunuki and Angelsen does not teach or suggest elements of claims 1, 13 and 21. As described above, the operation switches of Mochizuki and Okunuki are not related to the activation of any motor to rotate or pivot a transducer array a predetermined angle. Similarly, as set forth above, Angelsen does not teach or suggest any rotational control device at all. Therefore, the Applicant respectfully

submits that a combination of Mochizuki, Okunuki and Angelsen also does not teach or suggest elements of claims 1, 13 and 21.

The present rejection encompasses claims 7-8, 19-20 and 27-28. Claims 1, 13 and 21 are respectfully submitted to recite limitations not taught or suggested by Mochizuki, Okunuki or Angelsen, alone or in combination. Claims 7-8, 19-20 and 27-28 depend from claims 1, 13 and 21. Therefore, the Applicant respectfully submits that claims 7-8, 19-20 and 27-28 should be allowable.

The Applicant next turns to the rejection of claims 10-12, 14 and 30-32 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki and Okunuki in view of Cerofolini. Cerofolini describes a multipanoramic ultrasonic probe. Cerofolini also discloses a stepper motor control device consisting of a microprocessing device for applying drive signals to two stepper motors (FIG. 7; col. 8, lines 63-67; col. 9, lines 1-12). The control system comprises a CPU 80 that controls the activities of the various elements of the ultrasonic imaging system by generating control signals to two stepper motors (col. 9, lines 6-10; FIG. 7). The CPU 80 generates and applies drive signals to the two stepper motors (col. 8, lines 63-67; col. 9, lines 1-2). For each pulse of a drive signal sent by the control system (or CPU 80), the stepper motors of Cerofolini advance by one microstep, or incremental step angle (col. 8, lines 20-27).

As described above, the operation switches of Mochizuki and Okunuki are not related to the activation of any motor to rotate or pivot a transducer array a predetermined

angle, whether the predetermined angle is greater than an incremental step angle of the stepper motor or otherwise. Moreover, Cerofolini fails to remedy the shortcomings of Mochizuki and Okunuki. Specifically, the control system of Cerofolini is limited to a CPU 80 that advances a stepper motor by an incremental step for every pulse sent by the CPU 80 (col. 8, lines 20-27; col. 9, lines 6-10; FIG. 7). In this way, Cerofolini merely discloses a control system that may only advance a stepper motor by no more than an incremental step for each given activation of the control system. While the CPU 80 of Cerofolini may be programmed to send multiple pulses in order to move the motor greater than a single microstep, everytime the CPU 80 is activated to send a pulse, the motor advances only a single microstep (col. 8, lines 20-68; col. 9, lines 1-12).

Conversely, Cerofolini does not teach or suggest a rotational control device activating a motor or stepper motor to rotate or pivot the transducer array a predetermined angle for each activation of the device or when the device is activated, where the predetermined angle is greater than an incremental step angle of the motor or stepper motor, as recited in claims 1, 3, and 21. Instead, as described above, the control system of Cerofolini is limited to advancing two stepper motors each an incremental amount for every activation, or pulse sent, by the control system or CPU 80 (col. 8, lines 20-27; col. 9, lines 6-10; FIG. 7). Therefore, Cerofolini is incapable of teaching or suggesting a rotational control device capable of advancing a stepper motor more than an incremental step angle every time the device is activated. In this way, the Applicant respectfully submits that Cerofolini does not teach or suggest the elements of claims 1, 13 and 21.

Assuming, for argument's sake, that one would be motivated to combine Mochizuki, Okunuki and Cerofolini, the combination still would not teach or suggest elements of the present claims. As described above, the operation switches of Mochizuki and Okunuki are not related to the activation of any motor to rotate or pivot a transducer array a predetermined angle, whether the predetermined angle is greater than an incremental step angle of the stepper motor or otherwise. In addition, the control system of Cerofolini is limited to a CPU 80 that advances a stepper motor by an incremental step for every pulse sent by the CPU 80 (col. 8, lines 20-27; col. 9, lines 6-10; FIG. 7). In this way, Cerofolini merely discloses a control system that may only advance a stepper motor by no more than an incremental step for each given activation of the control system. Thus, the Applicant respectfully submits that a combination of Mochizuki, Okunuki and Cerofolini fails to teach or suggest elements of claims 1, 13 and 21.

Therefore, the Applicant respectfully submits that the claims of the present application should be allowable over the prior art.

CONCLUSION

If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of GTC, Account No. 07-0845.

Respectfully submitted,

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